Supporting Information

Preparation of Microfibrous Fe/LTA Zeolite Membrane Catalyst for Acetone Oxidation: Effect of Preparation Method

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Text S1 Arrhenius equation and activation energy calculation

The reaction rate (racetone, mmol m^{-3} s^{-1}) was calculated by Eq (S1):

$$r_{acetone} = \frac{X_{acetone} \cdot V_{acetone}}{V_{cat}} \quad \text{(S1)}$$

where V_{cat} represents the catalyst volume (m^3), $X_{acetone}$ is the conversion of acetone, and $V_{acetone}$ is the acetone gas flow rate (mol s^{-1}).

A dependence of the reaction rate ($r_{acetone}$) on the products of CO_2 and H_2O may be ignored and the empirical kinetic expression of the reaction rate equation of acetone oxidation can be described as Eq (S2),

$$r_{\text{acetone}} = A\exp(-\frac{E_a}{RT})P_{\text{acetone}}^{\alpha}P_{O_2}^{\beta} \quad \text{(S2)}$$

Taking the natural logarithm of Eq (S2), Eq (S3) can be obtained,

$$\ln r = \ln A + \alpha \ln P_{\text{acetone}} + \beta \ln P_{O_2} - E_a/(RT) \quad \text{(S3)}$$

The components of the reactant gas feed undergo minor changes during the kinetics data testing. Therefore, $\ln A$, $\alpha \ln P_{\text{acetone}}$, and $\beta \ln P_{O_2}$ can be supposed to be approximately constant, and Eq (S3) can be simplified to Eq (S4),

$$\ln r = -\frac{E_a}{RT} + C \quad \text{(S4)}$$

The apparent activation energy (Ea) can be obtained from the slope of the resulting linear plot of lnr versus 1/RT.

Table S1 Comparison of catalytic combustion of acetone on Fe/LTA/PSSF and other catalysts

Catalyst	concentration (ppm)	space velocity (h^{-1})	T50 (℃)	T90 (℃)	Refs.
Fe/LTA/PSSF-IM-3	1500	13221	208	230	this work
$Mn_{0.3}Ti$-NF	500	360000	260	290	[1]
10V-TiC	500	72000	230	292	[2]
Pt/BAsap	600	34000	245	/	[3]
V_5Ti	500	360000	270	300	[4]
Mn/GAmont-Zr	600	34000	310	335	[5]
$Pd_{0.01}Mn_{0.2}/Ti$	1000	30000(ml/g/h)	205	259	[6]
$La_{0.6}Pb_{0.2}Ca_{0.2}MnO_3$	1000	5100	180	250	[7]
$Ce_{0.8}$-Mn/AC	100	1500	175	245	[8]
Pt-Ce/TiO2	1000	/	210	236	[9]

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